CLAIMS:

1. An apparatus, comprising:

a first optical transmission medium formed in at least a portion of a device layer;

a second optical transmission medium formed in at least a portion of the device layer; and

a slot formed in at least a portion of the device layers, wherein the slot has at least one curved edge, and wherein the slot is disposed adjacent to the first and second transmission media.

2. The apparatus of claim 1, wherein the slot has at least one edge having a non-zero radius of curvature.

3. The apparatus of claim 2, wherein the at least one edge having a non-zero radius of curvature comprises at least one edge having a non-zero radius of curvature in a plane substantially parallel to a surface of the substrate.

4. The apparatus of any of claims 1 to 3, where in the first optical transmission medium forms a waveguide.

5. The apparatus of claim 4, wherein the waveguide is oriented approximately perpendicular to a transverse edge of the slot.

6. The apparatus of claim 5, wherein the waveguide terminates approximately at the transverse edge of the slot.

7. The apparatus of claim 4, wherein the waveguide and the slot are formed at a relative angle such as to reduce reflections causing unwanted light to travel in either direction in the waveguide.

8. The apparatus of claim 4, wherein at least a portion of the waveguide is oriented approximately parallel to a transverse edge of the slot.

9. The apparatus of any of claims 1 to 8, where in the second optical transmission medium is at least one of a waveguide, a ring resonator, a whispering gallery mode object, a grating defined cavity, a photonic crystal, and a photonic band-gap object.

10. The apparatus of any of claims 1 to 9, further comprising a third optical transmission medium.

11. The apparatus of claim 10, wherein the third optical transmission medium is at least one of a waveguide, a ring resonator, a whispering gallery mode object, a grating defined cavity, a photonic crystal, and a photonic band-gap object.

12. The apparatus of any of claims 1 to 11, wherein the slot is adapted to receive a phase adjusting element.

13. The apparatus of claim 12, where in the phase adjusting element comprises:

a substrate having a shape selected to permit the phase adjusting element to be inserted into the slot;

an opening formed in the substrate so that the opening is proximate the waveguide when the phase adjusting element is inserted in the slot; and

an electro-optically active material deployed in the opening.

14. The apparatus of claim 13, wherein the at least one electrode is deployed on the substrate.

15. The apparatus of claim 14, further comprising at least one conductive element coupled to the at least one electrode deployed on the substrate of the phase adjusting element.

16. The apparatus of claim 12, wherein the phase adjusting element comprises an electro-optically active liquid introduced into the slot.

17. The apparatus of claim 12, wherein the phase adjusting element introduced into the slot comprises a material that becomes increasingly electro-optic when introduced into the slot.

18. The apparatus of any of claims 1 to 17, wherein a surface of the slot is modified to provide at least one of an interpenetrating polymer matrix, a carbon nanotube, an auxiliary dopant, and a surface treatment resulting from an introduced material.

19. The apparatus of any of claims 1 to 18, wherein a surface of the slot has a preferred molecular orientation.

20. The apparatus of any of claims 1 to 19, further comprising at least one electrode deployed proximate the slot, the at least one electrode being adapted to provide at least a portion of a variable electric field within the slot.

21. The apparatus of claim 20, wherein the at least one electrode has at least one curved electrode edge.

22. The apparatus of claim 21, wherein the at least one electrode has at least one electrode edge having a non-zero radius of curvature.

23. The apparatus of claim 22, wherein the at least one electrode edge having a non-zero radius of curvature comprises at least one electrode edge having a non-zero radius of curvature in a plane substantially parallel to a surface of the dielectric layer.

24. An apparatus, comprising:

a substrate;

a device layer formed above the substrate;

a waveguide formed in at least a portion of the device layer;

a slot formed in at least a portion of the device layer and having at least one edge having a non-zero radius of curvature in a plane substantially parallel to a surface of the device layer, wherein the slot allows at least a portion of light propagating in the waveguide to be transmitted from the waveguide to another transmission medium;

at least one electrode deployed proximate the slot, the at least one electrode having at least one electrode edge having a non-zero radius of curvature in a plane substantially parallel to a surface of the device layer and being capable of providing at least a portion of a variable electric field in the slot; and

a phase adjusting element deployed in the slot.

25. The apparatus of claim 24, wherein the phase adjusting element comprises:

a substrate having a shape selected to permit the phase adjusting element to be inserted into the slot;

an opening formed in the substrate so that the opening is proximate the waveguide when the phase adjusting element is inserted in the slot; and

an electro-optically active material deployed in the opening.

26. The apparatus of claim 24 or 25, wherein the at least one electrode is deployed on the substrate of the phase adjusting element.

27. The apparatus of any of claims 24 to 26, wherein the slot allows at least a portion of the light propagating in the waveguide to be transmitted from the waveguide to at least one of a waveguide, a ring resonator, a whispering gallery mode object, a grating defined cavity, a photonic crystal, and a photonic band-gap object.

28. A method, comprising:

forming a first optical transmission medium in at least a portion of a device layer;

forming a second optical transmission medium in at least a portion of the device layer; and

forming a slot in at least a portion of the device layer, wherein the slot has at least one curved edge, and wherein the slot is disposed adjacent to the first and second transmission media.

29. The method of claim 28, wherein forming the first optical transmission medium comprises forming a waveguide oriented approximately perpendicular to a transverse edge of the slot.

30. The method of claim 28 or 29, wherein forming the slot comprises forming the slot such that the waveguide terminates proximate the approximately transverse edge of the slot.

31. The method of claim 28, wherein forming the first optical transmission medium comprises forming a waveguide, wherein at least a portion of the waveguide is oriented approximately parallel to a transverse edge of the slot.

32. The method of any of claims 28 to 31, where forming the second optical transmission medium comprises forming at least one of a waveguide, a ring resonator, a whispering gallery mode object, a grating defined cavity, a photonic crystal, and a photonic band-gap object.

33. The method of any of claims 28 to 32, further comprising forming a third optical transmission medium in the substrate.

34. The method of any of claims 28 to 33, further comprising deploying an electro-optically active element in the slot.

35. The method of claim 34, wherein deploying the electro-optically active element in the slot comprises introducing at least one of a liquid crystal and a polymer dispersed liquid crystal in the slot.

36. The method of claim 34, wherein deploying the electro-optically active element in the slot comprises inserting a phase adjusting element in the slot.

37. The method of claim 34, further comprising forming at least one of an interpenetrating polymer matrix, a carbon nanotube, and an auxiliary dopant within the optical medium introduced into the slot.

38. The method of claim 37, wherein the at least one of the interpenetrating polymer matrix, the carbon nanotube, and the auxiliary dopant extend to a surface of the slot.

39. The method of claim 34, further comprising treating the slot using at least one of silane, silane derivatives, additives that migrate to the surface of the slot, chromophores, stabilization agents, and refractive index modifiers.

40. The method of any of claims 28 to 39, further comprising deploying at least one electrode having at least one curved edge proximate the slot such that the at least one electrode is capable of providing at least a portion of a variable electric field in the slot.

41. A phase adjusting element for use in a phase adjustment system having a slot formed therein proximate a waveguide, comprising:

a substrate having a shape selected to permit at least a portion of the phase adjusting element to be introduced into the slot;

an opening formed in the substrate so that the opening is proximate the waveguide when the portion of the phase adjusting element is introduced in the slot;

at least one electrode formed proximate the opening; and

an electro-optically active material deployed in the opening.

42. The phase adjusting element of claim 41, where in the electro-optically active material comprises at least one of a liquid crystal, a supramolecular assembly, and an optically active medium.

43. The method of claim 42, wherein the electro-optically active material is disposed within at least one of a polymer matrix and an inter-penetrating polymer network.

44. The phase adjusting element of claim 43, wherein the polymer comprises at least one of a carbon-based polymer, a heterogeneous molecular system, a siloxane, a ladder siloxane, a silicon-containing polymer, a dendrimer, and a supramolecular assembly.

45. The phase adjusting element of claim 41, wherein a refractive index of the electro-optically active material is variable in response to an applied electric field.

46. The phase adjusting element of claim 41, where in the electro-optically active material is birefringent.

47. The phase adjusting element of claim 46, wherein an orientation of the refractive index of the birefringent electro-optically active material is variable in response to the applied electric field.

48. The phase adjusting element of claim 41, wherein the phase adjusting element is capable of being removed from the slot.

49. A method of forming a phase adjusting element for use in a phase adjustment system having a slot formed therein proximate a waveguide, comprising:

forming a substrate having a shape selected to permit at least a portion of the phase adjusting element to be introduced into the slot;

forming an opening in the substrate so that the opening is proximate the waveguide when the phase adjusting element is introduced in the slot;

forming at least one electrode proximate the opening; and

depositing an electro-optically active material in the opening.

50. The method of claim 49, wherein depositing the electro-optically active material comprises depositing at least one of a liquid crystal, a polymer stabilized liquid crystal, and a polymer dispersed liquid crystal in the opening.

51. The method of claim 49, wherein forming the substrate having the selected shape comprises forming the substrate such that the phase adjusting element is capable of being removed from the slot.

52. The method of claim 49, wherein forming the substrate comprises forming the substrate from at least one of Mylar and silicone.

53. The method of claim 49, wherein forming the at least one electrode comprises forming a plurality of electrodes capable of providing at least a portion of an electric fringing field of a selected orientation in the opening.

54. An apparatus according to claim 1, substantially as herein described with reference to the accompanying Figures.

55. A method according to claim 28, substantially as herein described with reference to the accompanying Figures.